

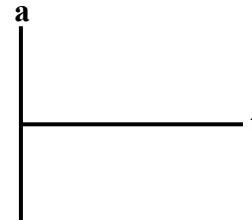
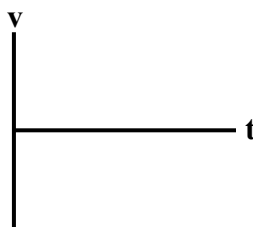
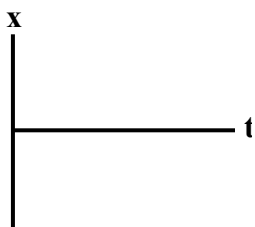
# PhET Walking Man Activity

Using one of the computers at the back of the room, go to

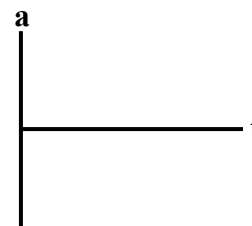
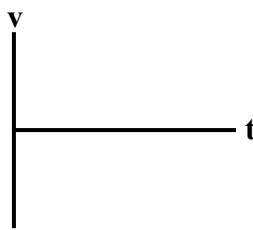
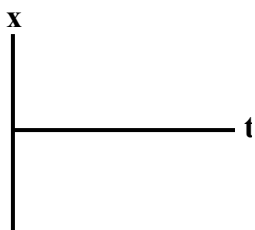
<http://www.colorado.edu/physics/phet/simulations-base.html> Look to the left of the page and choose “**Motion**”. When the simulations open, choose “**Walking Man**”.

Complete the following exercises. Use your paper if you need more room to explain. Make these explanation precise and very clear.

1. Look closely at the screen, noting the graphing area, the arrows and the area at the bottom of the page.
2. Move the man to the right at a slow but constant pace. In the space below draw the part of each graph that corresponds to the time the man was moving. (general shape is all you need at this point)



3. Repeat moving the man to the left.



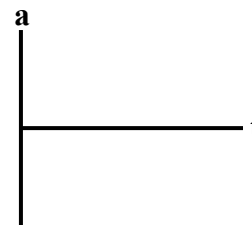
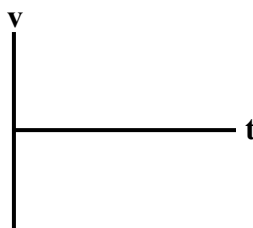
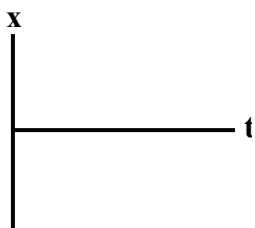
4. Explain the differences in each comparable graph. (Complete sentences)

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5. Repeat moving the man quickly to the right then quickly left. Draw the graphs below and label the movement right with an “R” and the left movement with a “L”.



6. What conclusions have you drawn concerning the position, velocity and acceleration graph during this exercise? \_\_\_\_\_

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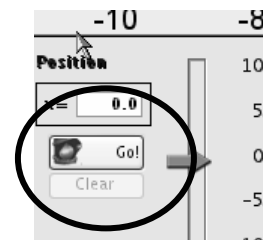
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7. Did you conclude there must be a better way? If not look back at your acceleration graphs.

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Use the area at the left of the screen to input values for the next exercises.

8. Input “-7” into the “x =” box, click “Go”. Describe what happened.



What did the graphs look like? \_\_\_\_\_

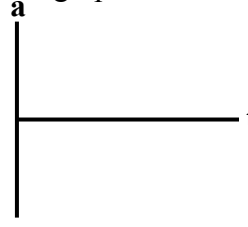
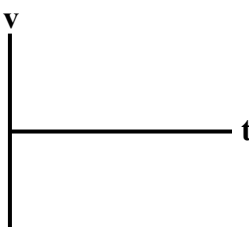
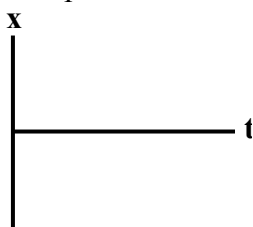
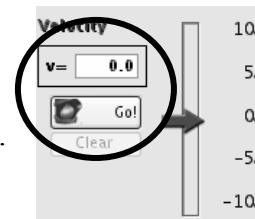
What do you mean nothing? Why did you get nothing?

\_\_\_\_\_

What do you think will happen if you put “+7” in the “x =” box?

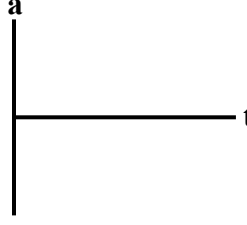
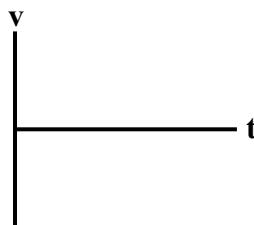
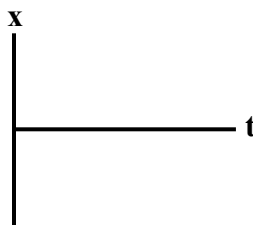
\_\_\_\_\_ Try it!

9. Input “+5” into the “v =” box, click “Go”. Draw the basic shape of the graphs below.



Why is the acceleration graph on zero? \_\_\_\_\_

10. Input “-5” into the “v =” box, click “Go”. Draw the basic shape of the graphs below.



11. Explain why you see a difference in these two sets of graphs. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

12. What does the spike in the acceleration graph indicate? \_\_\_\_\_

13. Predict what will happen to the graph if you increase the “v =” value.

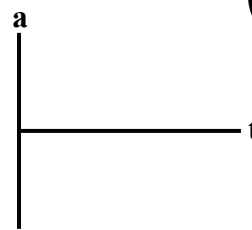
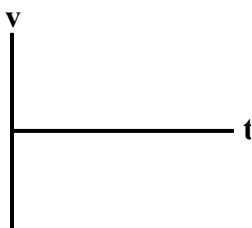
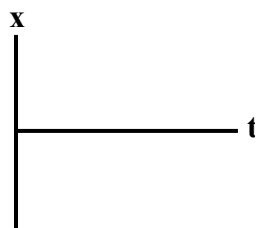
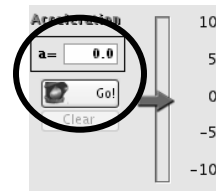
Position graph will \_\_\_\_\_

Velocity graph will \_\_\_\_\_

Acceleration graph will \_\_\_\_\_

Now try it!

14. Input “0.5” into the “a =” box, click “Go”. Draw the graphs below.



Explain how these graphs are different from those in question # 9. \_\_\_\_\_

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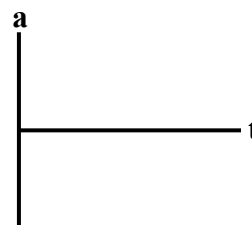
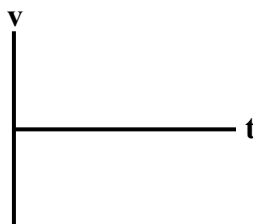
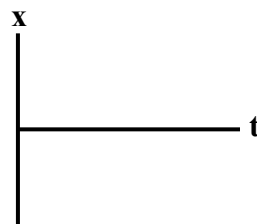


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15. Input “-5” into the “a =” box, click “Go”. Draw the graphs below.



What are the differences between these graphs and the graphs in #14? \_\_\_\_\_

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16. For each segment below draw the segment on the graphs provided. Label each segment with the appropriate letter.

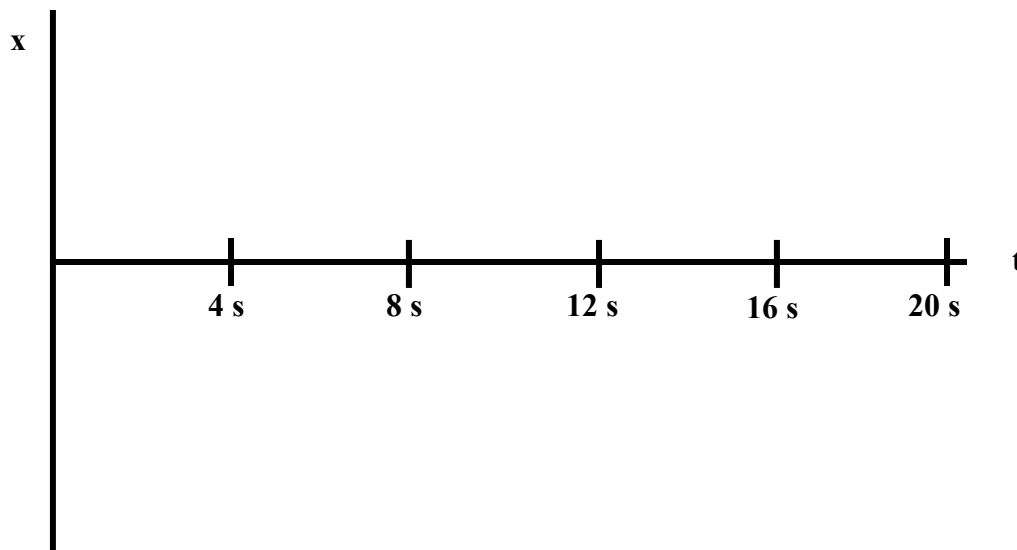
A. Input these values  $x = -9$ ;  $v = 2$  and click “Go”. Run for 4 seconds. Click “Pause”.

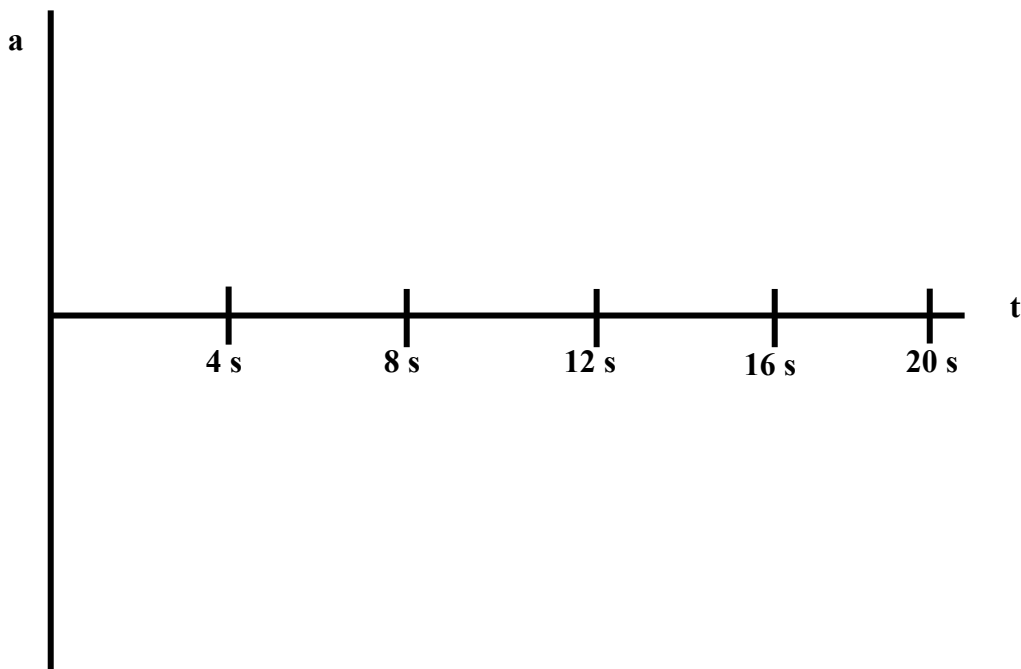
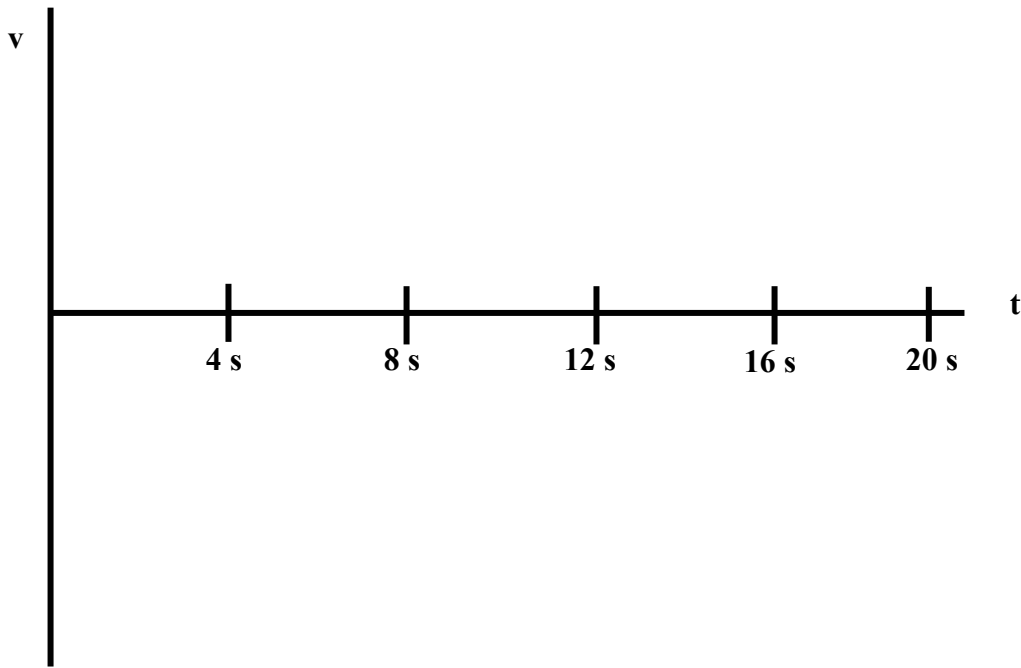
B. Input  $a = 2$  and click “Go” again. Run for 4 seconds. Click “Pause”.

C. Input  $a = 0$  and  $v = 0$ . Click “Go”. Run for 4 seconds.

D. Input  $a = 0$ ,  $v = 0$ ,  $x = -9$ . Click “Go”. Run for 4 seconds. Click “Pause”.

E. Input  $v = 10$ ,  $a = -4$ . Click “Go”. Run for 4 seconds. Click “Pause”.





17. In each of the following identify the segment and graph. Example **A-velocity/time**

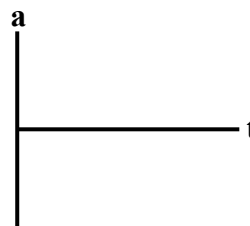
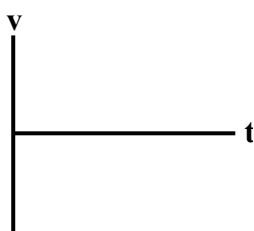
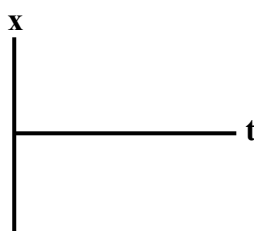
Which segment(s) show the greatest displacement during the 4 seconds? \_\_\_\_\_

Which segment(s) show a negative slope? \_\_\_\_\_

Which segment(s) show a zero slope? \_\_\_\_\_

Which segment(s) show a zero slope but a “b”  $\neq 0$ ? \_\_\_\_\_

18. Input  $x = 9$ ,  $v = -10$ ,  $a = 3$ . Click “Go”. Draw the graph for the first 7 seconds.



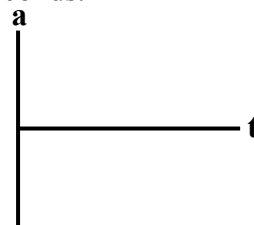
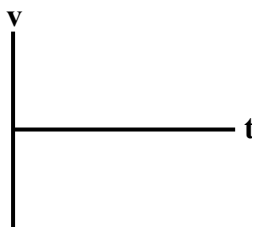
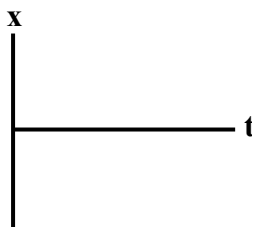
19. At the bottom of the page check the Velocity and Acceleration Vectors.

Run the simulation again with these arrows on. Compare the velocity arrow and the acceleration arrow

when the man is slowing down? \_\_\_\_\_

When the man is speeding up? \_\_\_\_\_

20. Input  $x = -9$ ,  $v = 10$ ,  $a = -3$ . Click “Go”. Draw the graph for the first 7 seconds.



Compare the graphs in # 18 and 19. \_\_\_\_\_

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21. Run the input data in #20 again with the arrows, Compare the velocity arrow and the acceleration arrow

when the man is slowing down? \_\_\_\_\_

When the man is speeding up? \_\_\_\_\_

22. Design a unique exercise with at least 3 different segments. Print your graphs. Staple them to this sheet and discuss the finer points of your exercise. Pay attention to the slope values and “b” values you give the man. \_\_\_\_\_

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